

# Two populations of *Temnothorax nylanderi* display differential adaptation in response to heavy metal exposure

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Cities are unique opportunities for scientists to study the adaptation of species to environmental changes. Indeed, cities are quite recent, they involve strong modifications of the environment, and each city constitutes an independent replicate. The urban environment has specific features including warm temperatures, fragmented habitat, human presence and light, noise and chemical pollutions. Species that manage to live in such environment often have generalist or opportunistic diets, tolerate human presence and display bold behavior. Species that are not adapted can also maintain urban populations through migration from non-urban source populations. Adaptive traits can result from either genetic evolution or phenotypic plasticity. Most traits linked with urbanization have been found by comparing different closely related species living either in urban or non-urban environments, however studies comparing populations of the same species from different environments are scarce. Our study aims to determine whether urban populations are adapted to chemical pollution. We used different population of the ant *Temnothorax nylanderi*, a common species in city parks and forest. We reared colonies collected from forests and urban habitats from three cities (Paris, Bordeaux, Lyon) under either a normal or a cadmium-supplemented diet. Cadmium is a heavy metal pollutant found at high concentration in cities. We measured traits of laboratory-born workers (size, immunocompetence) as well as mortality rate of both workers and larvae, and we compared these traits between treatments and habitats. We discuss whether colonies from urban habitats are more adapted to heavy metal pollution than colonies from forest habitats.